

## WHAT IS CLAIMED IS

1. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
5       providing two or more animals of the same species;  
      determining in each animal the quantity of CD16 antigen-expressing cells; and  
      selecting the animal with the lowest quantity of CD16 antigen-expressing cells,  
10       thereby selecting for robustness among two or more animals.
2. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
15       providing two or more animals of the same species;  
      determining in each animal the quantity of CD16 and CD2 double-positive antigen-expressing cells; and  
      selecting the animal with the lowest quantity of CD16 and CD2 double-positive antigen-expressing cells,  
20       thereby selecting for robustness among two or more animals.
3. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
25       providing two or more animals of the same species;  
      determining in each animal the quantity of CD8 antigen-expressing cells; and  
      selecting the animal with the lowest quantity of CD8 antigen-expressing cells,  
30       thereby selecting for robustness among two or more animals.
4. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
35       providing two or more animals of the same species;  
      determining in each animal the quantity of MHC-DQ antigen-expressing cells; and

selecting the animal with the highest quantity of  
MHC-DQ antigen-expressing cells,  
thereby selecting for robustness among two or more  
animals.

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5. A method for selecting for robustness among two or  
more animals, the method comprising the steps of:

providing two or more animals of the same species;

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determining in each animal the quantity of cells  
expressing an antigen that is targeted by MHC-DQ  
antibodies as MHC-DQB; and

selecting the animal with the highest quantity of  
cells expressing an antigen that is targeted by MHC-DQ  
antibodies as MHC-DQB,

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thereby selecting for robustness among two or more  
animals.

6. A method for selecting for robustness among two or  
more animals, the method comprising the steps of:

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providing two or more animals of the same species;

determining in each animal the quantity of cells  
expressing an antigen that is targeted by MHC-DQ  
antibodies as MHC-DQD; and

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selecting the animal with the highest quantity of  
cells expressing an antigen that is targeted by MHC-DQ  
antibodies as MHC-DQD,

thereby selecting for robustness among two or more  
animals.

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7. A method for selecting for robustness among two or  
more animals, the method comprising the steps of:

providing two or more animals of the same species;

determining in each animal the proliferation  
frequency of CD4 antigen-expressing cells; and

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selecting the animal with the lowest proliferation  
frequency of CD4 antigen-expressing cells,

thereby selecting for robustness among two or more animals.

5        8.    The method of claim 1, wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta canadensis*.

10       9.    The method of claim 2, wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta canadensis*.

15       10.   The method of claim 3, wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and  
20       *Branta canadensis*.

25       11.   The method of claim 4, wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and  
30       *Branta canadensis*.

30       12.   The method of claim 5, wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and  
35       *Branta canadensis*.

35       13.   The method of claim 6, wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus*

*domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta canadensis*.

14. The method of claim 7, wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta canadensis*.

15. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
providing two or more animals of the same species;  
determining in each animal the quantities of CD16 antigen-expressing cells, CD16 and CD2 double-positive antigen-expressing cells, CD8 antigen-expressing cells, MHC-DQ antigen-expressing cells, cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQB, and cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQD;  
determining in each animal the proliferation frequency of CD4 antigen-expressing cells; and  
selecting the animal with the lowest quantity of CD16 antigen-expressing cells, the lowest quantity of CD16 and CD2 double-positive antigen-expressing cells, the lowest quantity of CD8 antigen-expressing cells, the highest quantity of MHC-DQ antigen-expressing cells, the highest quantity of cells expressing an antigen targeted by MHC-DQ antibodies as MHC-DQB, the highest quantity of cells expressing an antigen targeted by MHC-DQ antibodies as MHC-DQD, and the lowest proliferation frequency of CD4 antigen-expressing cells,  
thereby selecting for robustness among two or more animals.

16. The method of claim 15, wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus*

*domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and  
*Branta canadensis*.

5 17. A method for selecting for robustness among two or  
more animals, the method comprising the steps of:  
providing two or more animals of the same species;  
determining in each animal the quantity of CD16  
antigen-expressing cells;  
determining a statistically significant association  
10 between an animal's quantity of CD16 antigen-expressing  
cells and robustness; and  
selecting for the animal in order to improve  
robustness based on the association.

15 18. A method for selecting for robustness among two or  
more animals, the method comprising the steps of:  
providing two or more animals of the same species;  
determining in each animal the quantity of CD16 and  
CD2 double-positive antigen-expressing cells;  
20 determining a statistically significant association  
between an animal's quantity of CD16 and CD2 double-  
positive antigen-expressing cells and robustness; and  
selecting for the animal in order to improve  
robustness based on the association.

25 19. A method for selecting for robustness among two or  
more animals, the method comprising the steps of:  
providing two or more animals of the same species;  
determining in each animal the quantity of CD8  
30 antigen-expressing cells;  
determining a statistically significant association  
between an animal's quantity of CD8 antigen-expressing  
cells and robustness; and  
selecting for the animal in order to improve  
35 robustness based on the association.

20. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
    providing two or more animals of the same species;  
    determining in each animal the quantity of MHC-DQ  
5 antigen-expressing cells;  
    determining a statistically significant association between an animal's quantity of MHC-DQ antigen-expressing cells and robustness; and  
    selecting for the animal in order to improve  
10 robustness based on the association.

21. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
    providing two or more animals of the same species;  
15      determining in each animal the quantity of cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQB;  
    determining a statistically significant association between an animal's quantity of cells expressing an  
20 antigen that is targeted by MHC-DQ antibodies as MHC-DQB and robustness; and  
    selecting for the animal in order to improve robustness based on the association.

22. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
    providing two or more animals of the same species;  
    determining in each animal the quantity of cells  
25 expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQD;  
30      determining a statistically significant association between an animal's quantity of cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQD; and  
35      selecting for the animal in order to improve robustness based on the association.

23. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
providing two or more animals of the same species;  
determining in each animal the proliferation  
5 frequency of CD4 antigen-expressing cells;  
determining a statistically significant association  
between an animal's proliferation frequency of CD4  
antigen-expressing cells and robustness; and  
selecting for the animal in order to improve  
10 robustness based on the association.

24. The method of claim 17 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and  
15 *Branta canadensis*.

25. The method of claim 18 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and  
20 *Branta canadensis*.

26. The method of claim 19 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and  
25 *Branta Canadensis*.

27. The method of claim 20 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and  
30 *Branta Canadensis*.

28. The method of claim 21 wherein the species is selected from the group consisting of *Bos taurus*, *Sus*  
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*scrofa, Ovis aries, Bison bison, Babalus babalus, Gallus domesticus, Meleagrus gallopavo, Anas rubripes, and Branta Canadensis.*

5        29. The method of claim 22 wherein the species is selected from the group consisting of *Bos taurus, Sus scrofa, Ovis aries, Bison bison, Babalus babalus, Gallus domesticus, Meleagrus gallopavo, Anas rubripes, and Branta Canadensis.*

10       30. The method of claim 23 wherein the species is selected from the group consisting of *Bos taurus, Sus scrofa, Ovis aries, Bison bison, Babalus babalus, Gallus domesticus, Meleagrus gallopavo, Anas rubripes, and*  
15       *Branta Canadensis.*

      31. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
          providing two or more animals of the same species;  
20        obtaining a biological sample from the animals, wherein the sample comprises whole blood;  
          determining in each animal the quantity of CD16 antigen-expressing cells; and  
          selecting the animal with the lowest quantity of  
25        CD16 antigen-expressing cells,  
          thereby selecting for robustness among two or more animals.

      32. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
30        providing two or more animals of the same species;  
          obtaining a biological sample from the animals, wherein the sample comprises whole blood;  
          determining in each animal the quantity of CD16 and  
35        CD2 double-positive antigen-expressing cells; and  
          selecting the animal with the lowest quantity of CD16 and CD2 double-positive antigen-expressing cells,



thereby selecting for robustness among two or more animals. )

33. A method for selecting for robustness among two or more animals, the method comprising the steps of:

providing two or more animals of the same species;  
obtaining a biological sample from the animals,  
wherein the sample comprises whole blood;

determining in each animal the quantity of CD8  
antigen-expressing cells; and

selecting the animal with the lowest quantity of  
CD8 antigen-expressing cells,  
thereby selecting for robustness among two or more animals.

34. A method for selecting for robustness among two or more animals, the method comprising the steps of:

providing two or more animals of the same species;  
obtaining a biological sample from the animals,  
wherein the sample comprises whole blood;

determining in each animal the quantity of MHC-DQ  
antigen-expressing cells; and

selecting the animal with the highest quantity of  
MHC-DQ antigen-expressing cells,

thereby selecting for robustness among two or more animals.

35. A method for selecting for robustness among two or more animals, the method comprising the steps of:

providing two or more animals of the same species;  
obtaining a biological sample from the animals,  
wherein the sample comprises whole blood;

determining in each animal the quantity of cells  
expressing an antigen that is targeted by MHC-DQ  
antibodies as MHC-DQB; and

selecting the animal with the highest quantity of cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQB,

thereby selecting for robustness among two or more animals.

36. A method for selecting for robustness among two or more animals, the method comprising the steps of:

providing two or more animals of the same species;

obtaining a biological sample from the animals, wherein the sample comprises whole blood;

determining in each animal the quantity of cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQD; and

selecting the animal with the highest quantity of cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQD,

thereby selecting for robustness among two or more animals.

37. A method for selecting for robustness among two or more animals, the method comprising the steps of:

providing two or more animals of the same species;

obtaining a biological sample from the animals,

wherein the sample comprises whole blood;

determining in each animal the proliferation frequency of CD4 antigen-expressing cells; and

selecting the animal with the lowest proliferation frequency of CD4 antigen-expressing cells,

thereby selecting for robustness among two or more animals.

38. The method of claim 31 wherein the species is

selected from the group consisting of *Bos taurus*, *Sus*

*scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta canadensis*.

39. The method of claim 32 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta canadensis*.

40. The method of claim 33 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta Canadensis*.

41. The method of claim 34 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta Canadensis*.

42. The method of claim 35 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta Canadensis*.

43. The method of claim 36 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta Canadensis*.

44. The method of claim 37 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta Canadensis*.

45. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
providing two or more animals of the same species;  
obtaining a biological sample from the animals,  
5 wherein the sample comprises whole blood;  
determining in each animal the quantity of CD16 antigen-expressing cells;  
determining a statistically significant association between an animal's quantity of CD16 antigen-expressing  
10 cells and robustness; and  
selecting for the animal in order to improve robustness based on the association.

46. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
15 providing two or more animals of the same species;  
obtaining a biological sample from the animals,  
wherein the sample comprises whole blood;  
determining in each animal the quantity of CD16 and  
20 CD2 double-positive antigen-expressing cells;  
determining a statistically significant association between an animal's quantity of CD16 and CD2 double-positive antigen-expressing cells and robustness; and  
selecting for the animal in order to improve  
25 robustness based on the association.

47. A method for selecting for robustness among two or more animals, the method comprising the steps of:  
providing two or more animals of the same species;  
30 obtaining a biological sample from the animals,  
wherein the sample comprises whole blood;  
determining in each animal the quantity of CD8 antigen-expressing cells;  
determining a statistically significant association  
35 between an animal's quantity of CD8 antigen-expressing cells and robustness; and

selecting for the animal in order to improve robustness based on the association.

48. A method for selecting for robustness among two or more animals, the method comprising the steps of:

providing two or more animals of the same species;  
obtaining a biological sample from the animals,  
wherein the sample comprises whole blood;

determining in each animal the quantity of MHC-DQ antigen-expressing cells;

determining a statistically significant association between an animal's quantity of MHC-DQ antigen-expressing cells and robustness; and

selecting for the animal in order to improve robustness based on the association.

49. A method for selecting for robustness among two or more animals, the method comprising the steps of:

providing two or more animals of the same species;  
obtaining a biological sample from the animals,  
wherein the sample comprises whole blood;

determining in each animal the quantity of cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQB;

determining a statistically significant association between an animal's quantity of cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQB and robustness; and

selecting for the animal in order to improve robustness based on the association.

50. A method for selecting for robustness among two or more animals, the method comprising the steps of:

providing two or more animals of the same species;  
obtaining a biological sample from the animals,  
wherein the sample comprises whole blood;

determining in each animal the quantity of cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQD;

determining a statistically significant association between an animal's quantity of cells expressing an antigen that is targeted by MHC-DQ antibodies as MHC-DQD; and

selecting for the animal in order to improve robustness based on the association.

51. A method for selecting for robustness among two or more animals, the method comprising the steps of:

providing two or more animals of the same species;

obtaining a biological sample from the animals, wherein the sample comprises whole blood;

determining in each animal the proliferation frequency of CD4 antigen-expressing cells;

determining a statistically significant association between an animal's proliferation frequency of CD4 antigen-expressing cells and robustness; and

selecting for the animal in order to improve robustness based on the association.

52. The method of claim 45 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta canadensis*.

53. The method of claim 46 wherein the species is selected from the group consisting of *Bos taurus*, *Sus scrofa*, *Ovis aries*, *Bison bison*, *Babalus babalus*, *Gallus domesticus*, *Meleagrus gallopavo*, *Anas rubripes*, and *Branta canadensis*.

54. The method of claim 47 wherein the species is selected from the group consisting of *Bos taurus*, *Sus*

*scrofa, Ovis aries, Bison bison, Babalus babalus, Gallus domesticus, Meleagrus gallopavo, Anas rubripes, and Branta Canadensis.*

5        55. The method of claim 48 wherein the species is selected from the group consisting of *Bos taurus, Sus scrofa, Ovis aries, Bison bison, Babalus babalus, Gallus domesticus, Meleagrus gallopavo, Anas rubripes, and Branta Canadensis.*

10       56. The method of claim 49 wherein the species is selected from the group consisting of *Bos taurus, Sus scrofa, Ovis aries, Bison bison, Babalus babalus, Gallus domesticus, Meleagrus gallopavo, Anas rubripes, and*  
15       *Branta Canadensis.*

      57. The method of claim 50 wherein the species is selected from the group consisting of *Bos taurus, Sus scrofa, Ovis aries, Bison bison, Babalus babalus, Gallus*  
20       *domesticus, Meleagrus gallopavo, Anas rubripes, and Branta Canadensis.*

      58. The method of claim 51 wherein the species is selected from the group consisting of *Bos taurus, Sus*  
25       *scrofa, Ovis aries, Bison bison, Babalus babalus, Gallus domesticus, Meleagrus gallopavo, Anas rubripes, and Branta canadensis.*